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One hundred and three presents were announced as having been received since the last meeting, including, amongst others:—

Annals of the Astronomical Observatory of Harvard College, vols. xxv., xxix., xxxi. part 2; vol. xl. part 2, presented by the Observatory; A. Auwers, Tobias Mayer's Sternverzeichniss, nach den Beobachtungen auf der Göttinger Sternwarte, 1756–60, presented by Professor Auwers; H. Gyldén, Traité Analytique des orbites absolues des huit planètes principales, tome i., presented by the author; photographs of portions of the Moon, retouched enlargements from negatives taken at the Lick Observatory, presented by Dr. L. Weinek.

Remarks upon Mr. Stone's Proposed Corrections to the Measure of Time since 1864. By Professor Simon Newcomb.

In the December number of the *Monthly Notices* Mr. Stone presents a very able and elaborate statement of certain corrections which he claims should be applied to the adopted measure of time from and after the beginning of 1864, together with the resulting corrections to the tabular places of the Moon derived from Hansen's tables. The great importance of the question raised by Mr. Stone seems to make it only respectful to him that I should once more state the difficulty in the way of accepting his conclusions.

The following numbers are extracted from Mr. Stone's paper on page 4 of the *Monthly Notices* for November, which give the results of certain Radcliffe observations of the Moon, made in 1892:—

Date, 1892 *January* 6.

	m	s
Correction to be subtracted from M.T. for change of Sidereal Time at Mean Noon since 1864		41·51
Observed Right Ascension of the Moon	49	19·57
R.A. from Hansen's Tables for uncorrected Mean Times ...		20·93
Hansen minus observed uncorrected		+ 1·36
Correction due to the change of unit in M.T.		− 1·46
Hansen minus observed corrected		− 0 10

In this and other papers it is claimed by Mr. Stone that the above correction of $41^{\mathrm{s}}{\cdot}51$ to the sidereal time of mean noon since 1864 has resulted from a progressive change, starting from the epoch 1864·0 and increasing uniformly at the rate of about $1^{\mathrm{s}}{\cdot}48$ annually. From this it follows that the tabular Right Ascensions of the Moon at transit over the meridian at Oxford, as computed from Hansen's Tables, should on the above date

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receive a correction of $1^{s}.36$ in consequence of the alleged change in the sidereal time at mean noon.

The claim that this correction starts from zero about 1864·0, and increases uniformly at the rate of about $1^{s}.48$ annually, is based by Mr. Stone on the fact that that was the date when Le Verrier's tables were introduced into the *Nautical Almanac*, and when, in consequence, according to Mr. Stone's theory, the new measure of time began.

Now, to show my difficulty, let us suppose that the old tables of the Sun had been continued up to the end of the year 1891, and that in the year 1892 Le Verrier's Tables had for the first time been introduced. To make my meaning perfectly clear I shall call the case of actual introduction in 1864, case A; and the supposed case of introduction in the year 1892, case B. On Mr. Stone's theory, the time t should in case B be counted from 1892·0, and the correction therefore for 1892 January 6 would have been substantially zero.

But it is evident that the tabular numbers for the whole year 1892, and therefore for January 6, would have been exactly the same in case B as they are in case A; that is to say, if the solar ephemeris from Le Verrier's Tables had been computed for the first time for the year 1892, all the quantities taken from the tables and printed in the *Nautical Almanac* would have been the same as they actually are. To claim that they would have been different would imply that the results of making a computation from Le Verrier's Tables are not merely a function of the numbers contained in the tables, but of the time when they began to be used for the ephemeris of the *Nautical Almanac.* Were this doctrine true it might also be possible that the quantities taken out from a table of logarithms were different from year to year. As this cannot be the case it conclusively follows that all the numbers used in computing the tabular place of the Moon at transit over the meridian of Oxford on 1892 January 6 would be exactly the same in case B that they are in case A. Consequently the result would have been the same as Mr. Stone gives it for the uncorrected time; that is to say, we should have had—

	m	s
Observed Right Ascension of the Moon	49	19·57
R.A. from Hansen Tables for uncorrected M.T.		20·93
Hansen minus observed uncorrected		+1·36
Correction due to the change of unit in M.T.		0·00
Hansen minus observed corrected		+1·36

Thus Mr. Stone's theory and his method of applying it give a correction zero for 1894·0 in case B, when in fact the numbers to be corrected are the same as they are in case A. From this conclusion I see no escape. From Mr. Stone's theory the use of the new unit of time would, in case B, have commenced in 1894.

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Here t must be reckoned from 1894·0, and the correction must be zero. Thus his theory gives two inconsistent corrections to the same numbers.

Note on Professor Newcomb's Remarks. By E. J. Stone, M.A., F.R.S., Radcliffe Observer.

Professor Newcomb's attempt to disprove my views by a *reductio ad absurdum* will be found to rest upon an interesting example of the very common logical fallacy of a *petitio principii.*

I have proved, or at least profess to have proved, in the *Monthly Notices*, vol. liv., that, with the two independent systems of time-measurement adopted in practical astronomical work, the tabular right ascensions, α^s, for the transits over an observer's meridian at the time $r+\delta r$ can only be accurately found from the equation

$$(1) \qquad \alpha^s = \phi\,(r+\delta r) = \phi\,(r) + \frac{d\,.\,\phi\,(r)}{dt}\left[\frac{\alpha^s - A_r{}^{s\prime} - \delta l^s - 86400^s\,.\,xr}{24^h\left(1+\dfrac{N}{2\pi}+x\right)}\right] + \&c.,$$

where $\phi(r)$ is the tabular right ascension computed directly from the tables for the time $t=r$; $A_r{}^{s\prime}$ the "local sidereal time at mean noon," computed for the time $t=r$, from a set of solar tables adopted for this purpose, and also used to fix the time at which in each year the Sun's mean longitude is equal to 280°; the corrections δl^s and x are quantities whose magnitudes depend upon the differences between the constants l and N, adopted for the epoch constant and mean motion of the Sun per "unit day" in the formation of the solar tables employed, and certain definite constants l_0 and N_0, which, if they had been adopted instead of l and N, would have rendered the corrections δl^s and x zero. These corrections, δl^s and x, necessarily change with the adoption of different values of l and N in our solar tables.

Now Professor Newcomb, undoubtedly following the usual course, determines certain quantities $\alpha_{\prime}{}^s$ from the equation

$$(2) \qquad \alpha_{\prime}{}^s = \phi\,(r) + \frac{d\,.\,\phi\,(r)}{dt}\left[\frac{\alpha_{\prime}{}^s - A_r{}^{s\prime}}{24^h\left(1+\dfrac{N}{2\pi}\right)}\right] + \&c.,$$

and calls the results thus obtained the tabular right ascensions at the meridian transits.

But if the equation (1) is exact, the equation (2) is inexact, and *vice versâ.*

It is therefore simply begging the question to assume, without proof, that the values of $\alpha_{\prime}{}^s$ found from the equation (2) are the correct tabular right ascensions at the meridian transits, and not the values α^s found from the equation (1).